Experimental Aircraft Models

"Enhancing the Homebuilt Experience"

Radio Control Scale Model

NewGlasair's Glasair IIS FT/TD

Assembly Instructions

Scale: 1= 4.62
Wingspan: 60 3/8" (1533 mm)
Wing Area: 589 sq. in (3798 dm^2)
Flying Weight: 6 – 7.5 lbs (2700 – 3400 g)
Wing Loading: 23.5 – 29.3 oz/ft^2
Length: 55.25" (1403 mm)
Radio: 5 Channels with 7 servos
Engines: .46 – .61 cu in 2 Cycle
.50 – .90 cu in 4 Cycle

Warranty

Experimental Aircraft Models, LLC (EAM) guarantees this kit to be free from defects in material and workmanship. The warranty does not cover individual parts damaged by modification or abuse. In no case will EAM's responsibility or liability exceed the original purchase price of the kit. EAM reserves the right to change or modify this warranty at any time.

EAM assumes or accepts no liability for the manner in which this model aircraft is used by the user, in any condition of assembly. By the act of purchasing this kit, the purchaser and any subsequent user accepts full responsibility and all resulting liability.

If the purchaser is not willing to accept the above liability associated with the use of this model aircraft, the purchaser is advised to return this kit immediately to the source from where it was obtained.

Please read this manual thoroughly before starting assembly. It includes critical assembly instructions and warnings in regards to the safe and enjoyable use of this scale aircraft model.

Experimental Aircraft Models, LLC
33924 Cotswold Rd.
Farmington Hills, MI 48335

Entire Document © Copyright 2003

About Your Model : You have purchased one of a limited production run of Glasair IIS RC model kits in the world. You have a very unique model of an Experimental aircraft.

In the United States, 'Experimental Aircraft' are aircraft that are 51% or more built by an individual (usually at home) and fly under an FAA issued "Flight Permit", rather than "Certification". During the past 20 years the most advanced designs in civil aviation aircraft have come from the 'Homebuilt' arena, where without the burden of certification expense and manufacturers liability insurance, aircraft of amazing performance and safety could be designed and offered to the public.

In our mission to support the homebuilder with a scale model of an aircraft project that may have consumed hundreds/thousands of hours to complete, we have brought together full-scale aircraft kit airframe manufacturers with a state-of-the-art world class ARF (Almost Ready to Fly) model manufacturer. Our intent is to provide as scale a model as possible that is as ARF as possible - within the confines of limited production run sizes and knowledge that a builder will likely customize to match their own aircraft. In that sense, this product caters more to the full scale builders, and scale modelers, than it does 'out of the box' flyers.

Some interesting details about the production of this model; We control the entire process of the model construction, starting with the direct import of balsa logs from Ecuador, to hand carving the fiberglass plugs and lay-up of the fiberglass components. The canopy molds are also hand carved and the vacuum forming is all done 'in-house'.

Just as the homebuilder customizes their personal aircraft, we have offered the model in pure white, so that you may do the same. We also include multiple landing gear configurations in the kit, so that you may choose between the full-scale configurations offered by the airframe kit manufacturer. For those unfamiliar with the FT/TD designation, the "TD" is the Conventional gear (TailDragger) version and the FT is the Fixed Tricycle gear version. Otherwise the airframes are identical. We use a formed aluminum main gear secured to the fuselage for the conventional version, and reverse the same gear and install it on the wings for the tricycle version.

Please note that we use aircraft terminology in our instructions. Specifically 'Port' is left and 'Starboard' is Right, and 'Forward' is to the front and Aft is to the rear. No matter how you may have the model turned Port is always the left side of the aircraft as the pilot sits in the cockpit facing forward. Thus if you are working on the model upside down with the tail facing towards you while installing servos, putting something on the Port side eliminates the confusion that 'left' side might result in.

A final point: Because the model is so special and the volumes (by model standards) so low, we need your help. We have tried our absolute best to get everything right the first time. If there is something during the construction and flying of the model that you feel could be done more easily or better, we'd like to know. This is how it's done in the full size experimental aircraft world, and we want to be sure that the same spirit is carried on in smaller scale. Builders are continually finding ways to improve the full size aircraft, and there is no reason why modelers should not have the same ability to contribute to a better product.

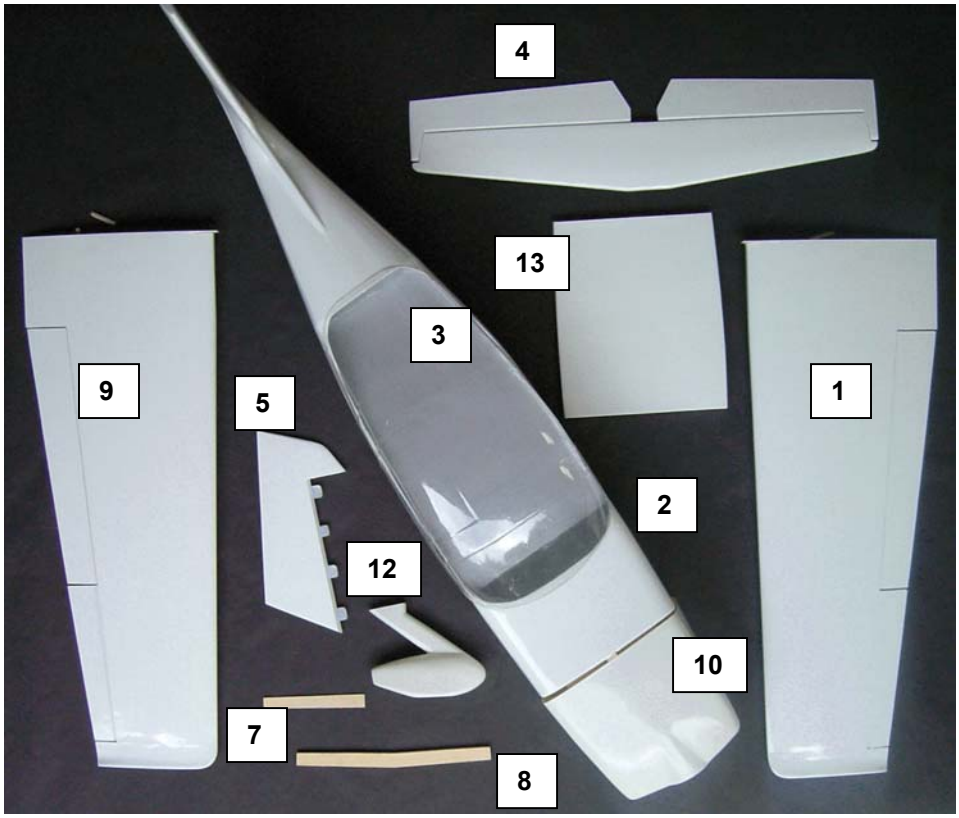
Please feel free to e-mail us with kit comments at: info@RCHomebuilts.com

We sincerely appreciate your vote of confidence in purchasing our rendition of NewGlasair's Glasair IIS and truly wish you the best of enjoyment.

Cleve L. Lee
Managing Director
Experimental Aircraft Models, LLC

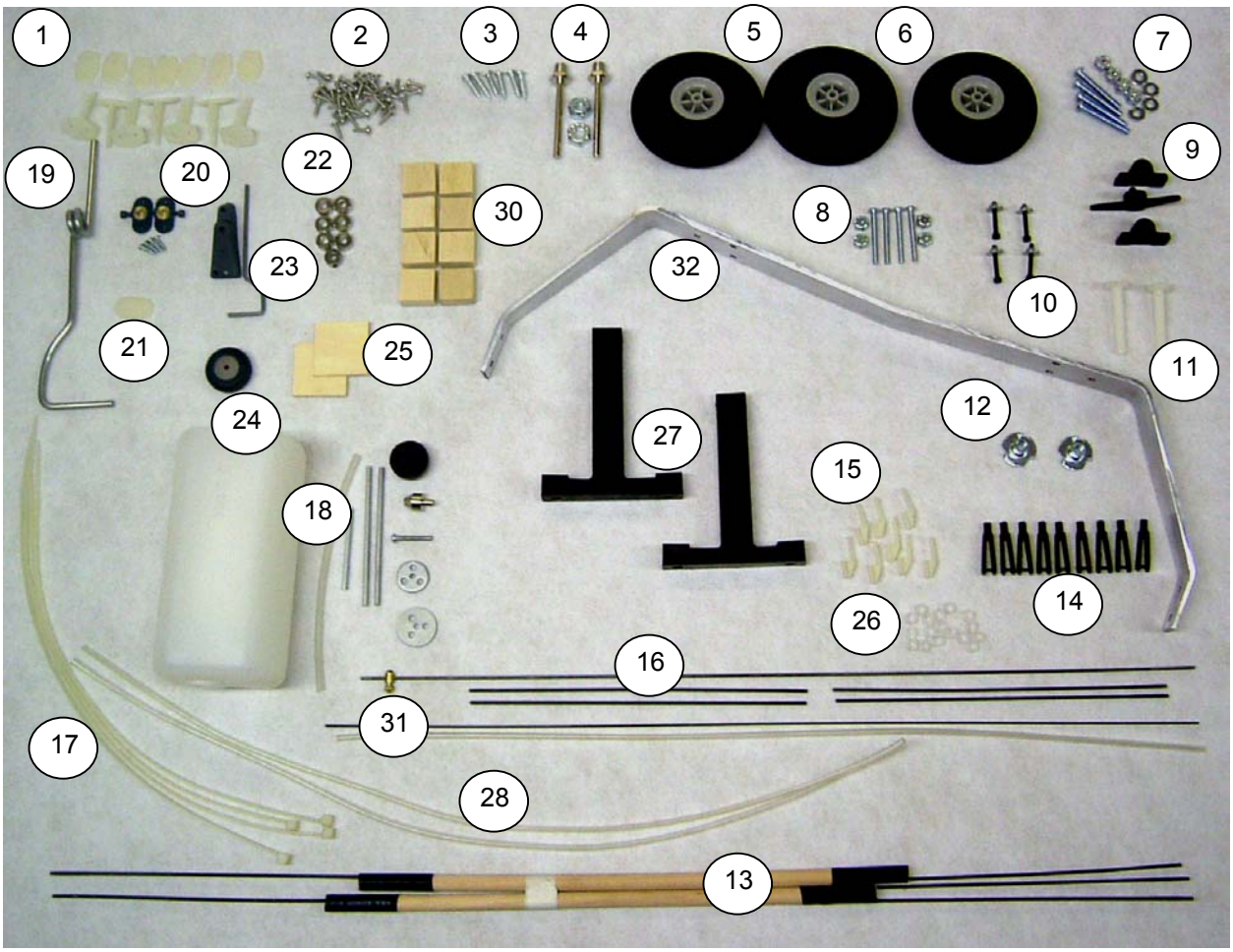
A note about the covering: Your Glasair SII is covered in White 'Oracover' – commonly known as 'Ultracote' in the U.S. This is a high quality material, but through temperature changes during shipping, the model may show wrinkles. This is normal. This symptom is also more visible in that your model is fully balsa sheeted. The covering can easily be tightened by the application of heat from a hair dryer/heat gun or hot iron. If using an iron, a piece of lightweight cotton (e.g. sheeting) placed between the iron and the covering helps to even the heating. Pressing lightly will transfer the heat to the covering, shrinking the material. Making a few pin pricks in the area and rubbing the hot area with a cloth further helps remove the wrinkles.

Airframe Components



Item	Description
1	Port (Left) Wing
2	Fuselage
3	Canopy
4	Stabilizer & Elevators
5	Rudder
6	Wing bolt protective strip (not shown)
7	Motor mount box top & corner brace (brace shown)
8	Wing Joiner
9	Starboard Wing
10	Fiberglass Cowl
11	Main gear wheel pants (not shown)
12	Nose gear wheel pant w/fairing
13	Wing Belly cover

Hardware



Item	Description	Detail	Qty.
1	Control horns	(1) Rudder (2) Elevator (2) Ailerons (2) Flaps	7
2	Control horn screws Cowl mounting screws Canopy attach screws Wheel pant attachment Wing Servo Cover	(14) #2 x3/8" Washer Head sheet metal screw (5) (5) (10) (16)	50
3	Landing Gear attach screw	M4 x 15 Pan head sheet metal screw	6
4	Axle shafts w/Lock Nuts	Spring steel axle shafts 5/32 x 1 ½" (4x40mm)	2
5	Main gear wheels	2.8" dia.	2
6	Nose wheel	2.7" dia	1
7	Engine Mount to Firewall bolts	8-32 x 1 ¼ socket head machine screw (U.S. Pack) 8-32 Locknuts #8 flat washers	4 4 4
8	Motor to Mount bolts	6-32 x 1 ¼" pan head machine screw 6-32 Lock nuts (Nylon insert)	4 4
9	Nose gear mount	A) Nylon two piece 5/32 (4mm) i.d. pivot hole B) Pivot arm w/collar insert & 4-40 socket head screw	2 1
10	Nose gear mounting bolts	4-40 x ¾" cap head machine screws 4-40 blind nut	4 4
11	Wing mounting bolts	¼-20 x 1 ½" Nylon	2
12	Wing mounting nuts	¼-20 Blind "T" nuts	2
Item	Description	Detail	

13	Pushrods. Elevators and Rudder	Wood 15 3/4" (400 mm)	2
14	Nylon Clevis Ends	(1) Rudder (2) Elevators (1) Throttle Servo (1) Steering Servo (2) Flaps (2) Ailerons	9
15	Nylon Quick Link	(1) Throttle arm (1) Steering arm (2) Ail (2) Flaps (1) Rudder (1) Elevator	8
16	Pushrod Wire	(4) .078 dia (2 mm) 6 ¾" (17 cm) – Ail. & Flaps (1) .047 dia (1.2 mm) 17"(43 cm) Throttle wire (1) 18" (46 cm) 2 mm steering wire (1) Nylon slip tube for 2 mm wire 17" (450mm)	
17	Tie wraps	12" tie wraps to secure radio and tank	4
18	Fuel Tank	380 CC	1
19	Wire nose gear	Spring steel – 5/32" (4 mm)	1
20	Main Gear Wheel Pants Retainers	Sullivan stamped steel retainers #2 Sheet metal screws	 4
21	Nose Wheelpant Retainer	Flat Nylon keeper	5
22	Wheel Retainers	5/32 ID. Collars, w/ 4-40 Cap Head screws	7
23	Tail wheel steering	Tailwheel steering bracket with mounting screws	1
24	Tail wheel		1
25	Nose wheel pant ply		2
26	Clevis Retainers	Silicon bands	18
27	Engine mount	Glass reinforced Nylon	1 pr
28	Nylon Guide Tube	2.7mm id. Guide tube to install rods 17"(450mm)	2
29	Motor mount template	OS .40 & OS .60 (not pictured)	1
30	Servo mounting blocks	¾ x ¾ x 3/8" wood blocks	8
31	Servo Stopper/Connector	Throttle wire attachment to servo	1
32	Main gear (Conventional)	Formed Aluminum	1
33	Main gear (Tricycle)	Formed wire (not shown)	L&R
34	Conventional Gear Hardware	Bolts w/blind nuts (not shown)	6 ea

Building the Wing

Sequence of events in this section:

- Installing Ailerons and Flap hinges
- Opening servo cover slots, wire and bolt holes in covering
- Threading servo wire extensions and installing servos
- Installing control arms, horns and pushrods
- Permanently assembling the wing halves
- Test fitting the wing

Additional components you may need from the hobby store:

CA Adhesive (Thin)
CA Adhesive (Medium)
(2) 12" Servo wire extensions
(2) "Y" Servo wire harnesses
(4) Extended length servo arms to fit your brand of servo (Optional)

Installing Ailerons and Flap Hinges

The control surfaces on the wings and stabilizers are not yet permanently attached. We have pre-cut and positioned the 'CA' hinges for you. In this step you will be removing the flaps and aileron control surfaces from the wings, prepare them for attachment, and permanently re-installing them on the wings.

1) Pull the ailerons and flaps away from the wing.

2) Trim away the Oracover from around the hinge slots on both the wings and the control surfaces. Our favorite method is to use an old soldering iron with a point on the end. This seals the Oracover to the wood at the same time as it melts back the covering from the slot. Otherwise a razor knife (or No. 11 scalpel) can be used to trim away the material. The objective is to be sure the adhesive can wick into the slot. You don't want an edge of film sitting against the hinge, which may prevent the adhesive from flowing into the slot.

3) Drill a small (1/16" or 1.5mm) hole in the center of each slot to help 'wick' the adhesive onto the hinge in the next step.

4) Insert the CA hinges halfway into the slots on the control surfaces and place about 4 –6 drops of CA into the slot on both sides of the hinge material.

5) Position the control surfaces up to the wing, inserting the now bonded hinges into the slots in the wing. Position both the flap and the aileron in the desired position, spacing as appropriate to make the distances between surfaces and wing equal. Apply a few drops of Thin CA to the bottom of the flap hinges, and then (after a few seconds) rotate the flap downward and apply adhesive to the top of the hinge.

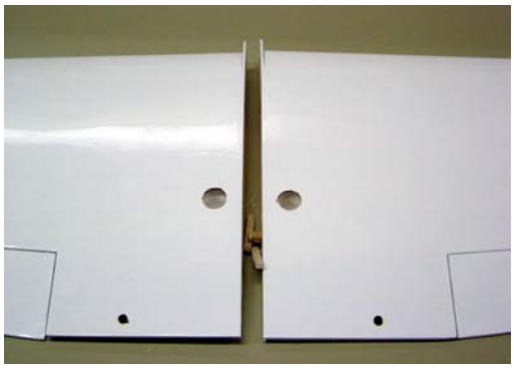
6) Finish the installation on the opposite wing.

7) Pull on the control surfaces to test their strength.

Opening wire, servo slots and bolt holes in covering

The Oracover must be removed in certain areas to allow mounting of the wing, clearance for servo pushrod operation and exiting of servo wires from the wing into the fuselage. We will also prepare the servo covers for mounting of the servos.

1) Referencing the picture, use either a sharp pointed razor knife or hot soldering iron and open the two ¼" (6mm) wing mounting bolt holes (top and bottom) and the two ½" wire exit hole located on the top of the wing. (The servo wires enter into the cabin space from the top side of the wing.) If using the razor knife, you'll get better results if you cut on the downward stroke – pushing the covering against the underlying wood for support as you cut.



2) Locate the servo bay covers on the bottom of each wing. Remove one at a time, mark the bottom side of the cover and inside the servo bay with a letter or number to maintain their relationship.
    a. *For future reference, note that the slots for the aileron servos are 'outboard' from the plane's center line, and are left and right (opposite) to each other. This is because the ailerons operate in opposite directions.*
    b. *The flap servo covers both have the slots to the same side of the servo cover centerline – because the flaps both operate in the same direction.*

3) Trim the slot opening of each servo cover with a sharp razor knife. (Don't use the soldering iron trick, as it will show the melted edge where it would be visible from the bottom side of the plane.)

4) With the covers in place, drill a 1/16" (1.5mm) hole at each corner. Install #2 x3/8" washer head screws, then remove and place a few drops of Thin CA into the holes to strengthen the threads.

Threading Servo Wire Extensions and Installing Servos

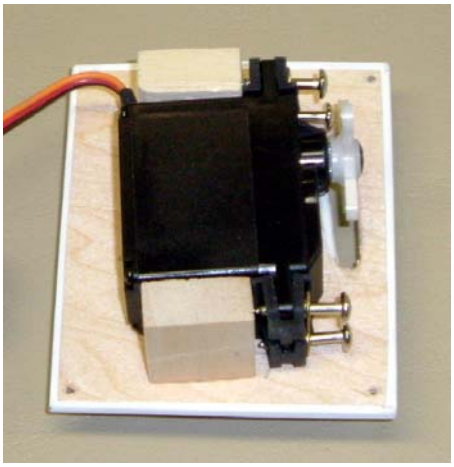
For ease of serviceability we secure the servos directly to the underside of the servo covers, mounting them to wood blocks. Verify that the servo arms are electrically neutral and you are using the length arm you intend to use. (Refer to your Radio owners manual for techniques for centering the servo arm.)

1) Install the rubber pads and eyelets into the servo mounting lugs (supplied by servo mfg.)

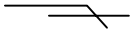
2) Position a servo on the back side of a servo cover, with the arm projecting at 90 degrees through the slot, and the face of the arm parallel to the slot.

3) Test fit two wood blocks (supplied) under the servo mounting lugs. Double check position of the servo arm in the slot, and allow room for compression of the rubber pads, if necessary, when the mounting screws are tightened.

4) Bond the wood blocks to the servo cover using at least a medium thickness CA adhesive, or better yet, epoxy.



5) Test fit the cover with the blocks & servo into the wing. In some cases the cover support in the wing may need to be cut away in the area of the block.

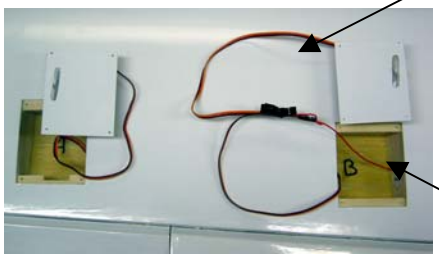
6) Before securing the servo, replace (if necessary) the output arm with an arm long enough to allow clearance of the pushrod when operated to extreme positions. *Alternatively, if you are unable to locate longer servo output arms, you can widen the slot to allow room for the rod keeper, (installed in the next section) which would otherwise interfere with the top side of the cover. This approach may require bending the push rod so that it enters the slot slightly more vertically - Like this*  *instead of*

7) Repeat the above process for all four wing servos. Again, note how the Flap servos both face in the same direction, while the aileron servos lay in opposite directions.

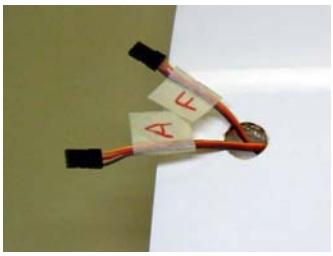
8) Plug a 12” servo cable extension on to both of the Aileron servo cables. Use a piece of heat shrink tubing or electrical tape to keep the connection secure.

9) Using the pre-installed monofilament pull string, draw the aileron servo cables through the wing **just up to the flap servo bay**.
    a. If the cord is missing or has been pulled through by accident, the plastic pushrod guide tubes or metal pushrods in the kit make great ‘snakes’. Insert into the root rib routing hole, push through to the servo bay and attach the servo cable to the wire/tube using electrical tape.

10) Secure the end of the flap servo cable behind the aileron connector (so they both fit through the hole) temporarily with tape, and pull the 'train' through to the root rib of the wing. Remove pull string.



Pull the servo wires out through the hole in the top of the wing. Separate the aileron and flap servo wires, and clearly label each for later connection to the receiver.



Pull String (shown enlarged)

11) Repeat the servo installation process for the other wing.

12) Plug the servos into the receiver and test their operation to be sure wire connections inside the wing remained tight.

Installing control arms, horns and pushrods

Now that the servos are installed and respond to the radio, it's time to make them move the control surfaces. Nylon control horns will be fastened to the ailerons and flaps, and pre-sized wire pushrods will be bent and cut to final length. Nylon clevises will then be threaded on to the ends of the pushrods and connected to the control horns.

1) Plug an aileron servo into the receiver and turn the transmitter 'on' and set the trim to center.

2) With the servo cover in place, but not screwed down, double check that the servo arm exits the slot perpendicular to the cover.

3) Position a nylon control horn on the aileron so that it is offset to one side and lines up with one side of the servo arm, not the centerline. Secure the control horn to the aileron with #2 x 3/8" screws. There are plywood hard points in the aileron into which you can screw directly. (If you prefer you can use the nylon backing plates, which will require longer screws.)

4) Retrieve a 6 ¾ " (170mm) pushrod, & thread a black rod clevis at least 20 half turns, and slip a silicon clevis retainer on to the assembly.

5) Temporarily attach the clevis to the control horn in a middle hole, and determine whether your servo arm is long enough to have a straight pushrod, or if the pushrod will require a bend to facilitate full travel of the servo arm without hitting the ends of the slot in the cover. (Seen note in step 6 above)

6) Bend the arm as required so that it will align with a hole on the servo arm (when centered), and then place the rod so that it passes over the desired hole in the servo arm. Mark the location of the hole on the wire and subtract 1/16" (1.5mm)

for a bend allowance. Carefully bend a right angle, in the direction opposite the offset of the control horn, so that it can enter the servo arm.

7) Cut off and deburr the end of the wire so that the right angle short leg measures at least 3/16" from the inside of the bend. The servo arm may require drilling of the hole to accept the pushrod wire diameter.

8) Secure the pushrod to the servo using a nylon Quick Link.

Permanently Assemble the Wing Halves

The two wing halves are joined using the plywood wing joiner and 30 minute epoxy.

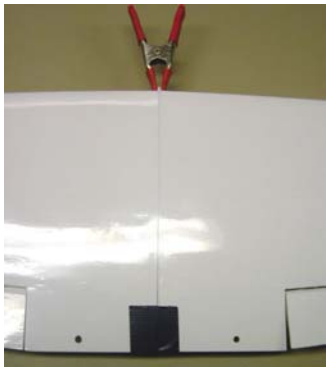
1) Locate the Wing Joiner – this piece strengthens the joint between the wings and sets the wing dihedral.

2) Test fit the Joiner into both wing halves and slide the wings together to be sure both root ribs meet at the center. Mark the center of the Joiner as a reference mark. Sand as necessary to get a smooth close fit.

3) Separate the wings and using a scrap piece of wood, Popsicle stick or tongue depressor, apply 30 minute epoxy to the inside of the Joiner box on both wings and one end of the Joiner. Slip the joiner into the wing.

4) Coat the root ribs on both wings and the remaining portion of the Joiner, and slip the wings together.

5) Wipe away the excess epoxy (Isopropyl alcohol does a good job) and clamp and tape the leading and trailing edges together to prevent twisting while drying. A small clamp on the leading edge root rib tabs is also helpful. (Consider protecting the clamp with cello packing tape.)



6) Set aside to dry in a location away from the dog and cat and some place flat so that you will not induce a twist. Support one wing so that the root ribs are kept fully pressed against each other. This guarantees the correct dihedral.

Test Mount Wing to Fuselage

1) Locate the two ¼-20 half high Blind nuts supplied in the US pack. With the fuselage upside down, place them beneath the plywood supporting the trailing edge, "T" side up, and pull them into place using the full thead ¼-20 UNC bolt and washer supplied in the U.S. Pack.

2) Insert the tabs at the leading edge of the wing into the slot

on the bulkhead where the leading edge fits, and lower the trailing edge against the fuselage.

3) Insert two ¼ - 20 Nylon Finger Wing Mounting Bolts through the wing holes and open as appropriate to allow easy insertion of the bolts. Nylon bolts are easy to cross thread, so use care. Remove the bolts for the next step.

4) Retrieve the wing Belly Cover and insert the doweled ends into the bulkhead at the leading edge of the wing. Lower the trailing edge into place. You will need to trim away the Oracover from over the wing bolt holes with a razor knife. Open up the holes to allow passage of the head for the Finger Bolts supplied.

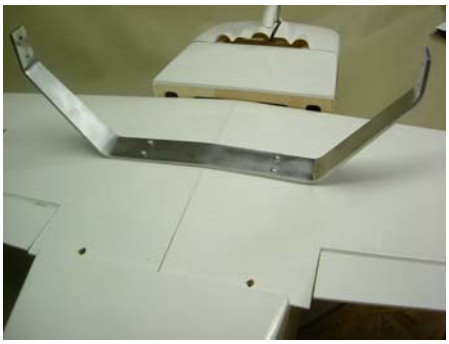
5) Insert the wing bolts, making sure all holes line up. The bolts will sit beneath the surface of the cover against a plywood shelf.

6) When all fits properly you may cut the bolts to a desired length (Best way to do this is to thread a nut onto the threads before cutting so that the removal of the nut cleans up the threads.)
7) Remove the wing for the next steps.

Installing the Tricycle Main Gear

If you are choosing to build the FT version of the aircraft, now is a good time to install the main aluminum landing gear on the wing. ***Skip this section if you are installing the conventional gear.***

1) Retrieve the aluminum landing gear and mark the center line between the two legs. The gear will be fitting against the bottom of the wing, and as such needs a slight bend in the middle to match the wing dihedral*. (We do not pre-bend it because it is used without the bend in the conventional gear version.)* Bend the gear at the center mark so as to move the legs apart. Check the fit of the bend against the center section of the wing. Bend the short legs back to vertical as required so that the axles, when place through the holes at the very ends, will be square with the ground.



2) In the U.S. pack we have supplied a set of DuBro 5/32" axles, improving upon most manufacturers use of threaded bolts as axles. Two minor modifications are required to enable using them:

    a. Cut them to length. Cut off approximately 3/8" (9.5 mm) so that the axle portion measures 1 ½" to 1 5/8" (38 – 41mm)

    b. Enlarge the main gear bolt holes (those closest to the ends of the aluminum gear). Using the existing hole as a pilot hole, drill them out to 5/16". This will allow insertion of the threaded portion of the axle into the landing gear.

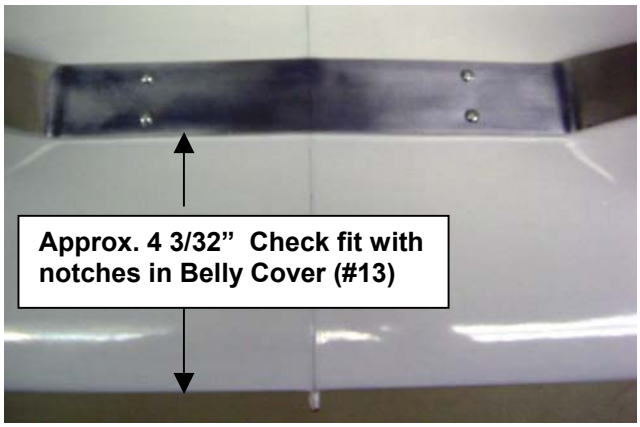
c. Install the axles onto the main gear and secure with the supplied locknuts.

3) You will see that the aluminum gear tapers from the center section down to the wheels along one edge, and is straight across on the other edge. You will be installing the landing gear so that the front/straight edge is forward.

4) Retrieve the M4 x 15 Pan Head Screws (#3) from the hardware pack.

5) Position the gear on the bottom of the wing so that the front edge is approximately 4 3/32" (104mm) from the leading edge of the wing. Verify this location with the notches in the belly cover #13. Make certain the gear is parallel to the leading edge. (See picture in step 6 below.)

6) Using the holes in the landing gear as a template, drill a 3/32" (2mm) hole. Insert an M4 x 15 pan head screw (#3) Drill a second hole on the opposite side to ensure correct positioning and insert a second screw. Now you can finish the installation of the remaining two holes.



Note that inside the wing the entire area beneath the landing gear is supported by a plywood insert in the wing. The plywood sits on ply ribs running forward to the joiner box and has triangular braces at each station where it crosses a rib. It's strong. If you wish to add additional screws you may do so.

Engine & Nose/Tail Gear Installation

Sequence of events in this section:

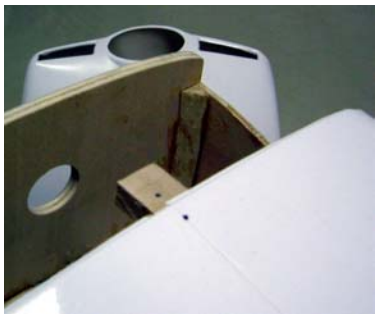
- Initial Cowl fitting
- Install the nose or tail wheel
- Positioning and installing the engine
- Assembling and installing the fuel tank and fuel lines

Additional components you may need from the hobby store:

"Pitts" style muffler or muffler extension for two cycle motors

Initial Cowl fit

As it is easier to handle the fuselage without the weight of the engine and without the tail surfaces on, we'll position and locate the cowl mounting screws at this point in time.



1. To help locate the cowl mounting blocks after the cowl hides them, use a felt tip marker and place a dot on the Oracover opposite the center of the cowl mounting blocks. (Acetone will easily remove the marker without hurting the Oracover.)

2. Locate the cowl and slip it over the 5 cowl mounting blocks. Position the top center of the cowl along the edge of the foredeck, and with the edge fitting over the recess and flush with the foredeck, apply a piece of tape to hold in place. (Don't cover the dot!)

3. Fit the rest of the edges around the circumference of the cowl. If the cowl is too tight, trim away the covering and possibly some of the plywood lip in the corners. It is designed for a snug fit, but not so tight as to crack the fiberglass.

4. When comfortable with the fit, drill a 1/16 (1.6mm) hole opposite each dot, ¼" (6mm) away from the edge of the cowl. Go all the way through the cowl block.

5. Install a #2 x3/8" washer head screw (No. 2) in each hole, and then remove. Remove the cowl. Reinforce the threads in the wood by adding a drop or two of thin CA.

6. Now is a good time to cut away the openings in the cowl. A flexible shaft tool (e.g. Dremel$_{TM}$) with a small milling bit works great. We assume you will be painting the cowl. This is a good time to wet sand with 320-400 grit sand paper in soapy water to prepare the cowling for painting. (Soap removes the mold release for better paint adhesion much better than solvents.) Since your hands are already wet, you might want to do the wheel fairings while you are at it.

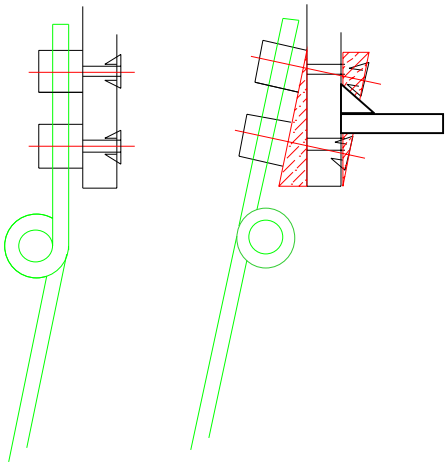
Install the Nose or Tail Wheel

If you are installing the Nose Wheel:

1) Locate the wire nose gear (19) and items (9) & (10) steering bracket, steering arm and mounting hardware. Also locate the separately packed wood shims.

Note: We are including parts to effect a recommended change to the landing gear geometry to improve performance when flying from grass.

To assist with this change we have packed separately (2) 12 degree wood shims that allow you to straighten the nose gear wire and assemble the steering bracket to the firewall at an angle. Since the nose wheel pant was designed for the 12 degree forward angle of the gear, this change in mounting method will maintain the proper wheel pant relationship to the ground and fuselage.



2) Referencing the diagram and picture, locate the center of the firewall and glue the shims on center and flush with the bottom. On the back side you will need to split the shim to go on both sides of the bottom of the engine mount box. (While technically incorrect, you can actually skip using the wedge on the back side. You will likely not remove the nose gear brackets very often and the angular misalignment of the bolt and nut when it is seated will act as friction to keep the bolt tight.)

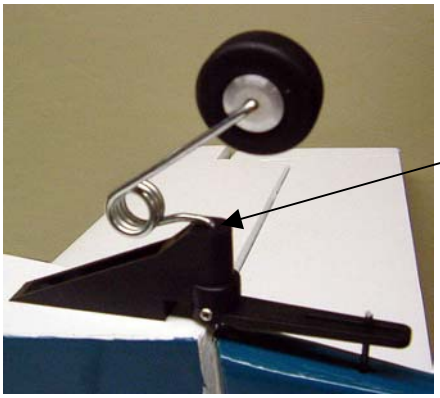
3) Straighten the nose gear to remove the bend at the coil.

4) After glue in step 2 is dry, use the steering bracket hardware as templates and drill the first mounting holes using a 7/64" (2.8mm) drill. Insert the nose gear into the brackets after the first hole is drilled and hold in place with a 6-32 bolt in that first hole. Finish the other holes while ensuring that the gear is square with the fuselage and can pivot easily.

5) Position the blind nuts from the back side of the firewall and secure the steering brackets in place. Use a drop of 'Loctite' or nail polish on the bolt threads to keep them from loosening.

6) Pull out the nose gear wire and steering arm and set aside. It's easier to work with the engine mount, next, without the gear in the way. (. . and it was easier to put the bracket on now than with the engine in the way . .)

If you are installing a Tail Wheel:



1) Locate the tail wheel hardware bag

2) Referring to the picture, insert the tail wheel axle/spring into the bracket and slide the steering arm over the protruding end. Note that the flat side of the arm will be 'upwards' or towards the bottom face of the rudder.

3) Align the steering arm with the bracket and snug the screw. (Use caution when tightening the screw so as not to strip the head.)

4) Position the assembly at the rear of the aircraft and drill three 1/16” (1.5mm) mounting holes using the bracket as a template.

5) Secure the bracket in place using the screws provided

6) Slide the tail wheel on the axle and hold in place using the supplied collar. Cut & deburr the excess wire if desired.

7) Later, after the rudder is installed you will insert a pin in the bottom of the rudder to steer the tail wheel.

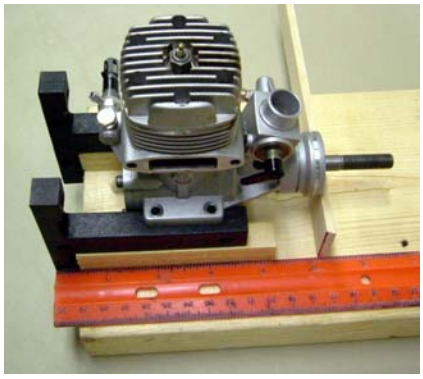
Positioning and Installing the Engine

The objective of this section is to place the engine on the firewall so that the back of the spinner clears the front of the cowl by 1/16” (1.5mm), and the spinner is centered on the cowl. Our instructions will work for all brands of engines.

A) Positioning the engine fore/aft (front to back) on the motor mount

1) Place the cowl on the model and secure with a few screws.

2) Measure from the firewall to the front edge of the cowl through the center opening. It is approximately 5 3/16” (131 mm) The firewall has a 2 degree offset built in, so measuring from the center is important.



3) Place the engine mounts on a work bench or piece of wood so that the short legs overhang, and raise the mounts enough so that when the engine sits on the rails, it will not bottom out on the bench.

4) Make sure the rails are square with the bench or wood, and the legs are touching the facing surface where they overhang. Place the engine squarely between the rails and position it so that the distance from the rear of the rails to the front face of the thrust washer is the same as you measured in step 2 above, and then move the motor forward 1/16” (1.5mm). You are better to err moving forward too much, than too little.

5) Mark the engine hole locations (we like using a ‘Transfer Punch’) and drill straight through. Secure the engine with four bolts and washers & locknuts on the bottom. (Not supplied)

B) Positioning the Engine Assembly on the Firewall and Preparing for Fuel Tank Installation

We have supplied a drawing of the engine mount location for an OS 40 and 61 – but due to manufacturing tolerances we like the direct method of positioning the engine/mounts, as opposed to measuring. That is, we'll put the engine/mounts assembly under the cowl, position it and mark the location. (This is easier with a second set of hands.) First test that the back plate for the Aluminum spinner supplied in the U.S. Pack slips over the prop shaft (A bushing is packed with the spinner nut) be sure it's a close fit, and easily removed. Then read '**1** through **10**' below before starting.

1) Remove the cowl and stand the model on its tail (preferably on a pad & make sure the tail wheel is pointed sideways.)

2) Place the engine/mount assembly on the firewall so that the cylinder exhaust faces the bottom of the aircraft (i.e. laying 'sideways') and the prop shaft is somewhat centered.

3) Place the cowl over the engine and ensure correct position with at least two screws.

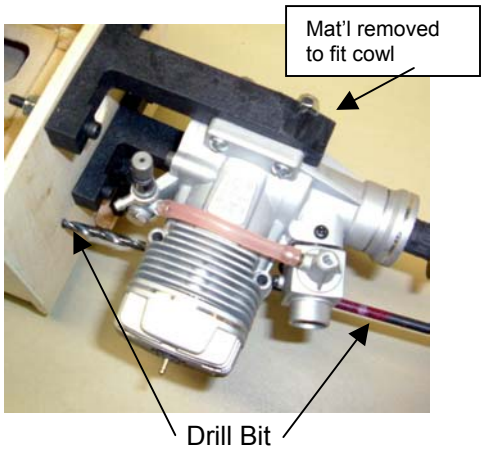
4) Move the engine by the prop shaft so that the spinner back plate is centered on the cowling and the cylinder is either horizontal or clears the inside of the cowl. *Note: On larger engine installations the top engine mount may be too close to the cowl at the front, requiring removing some material at the end of the engine mount to create a thinner section in that area. (See the picture alongside step 9 below.)*

5) Using a pencil through the cowl air inlet, press down on the shaft to prevent the engine from moving and mark the corners of both the upper and lower engine mounts against the plywood.

6) This is also a good time to verify the back plate clearance with the cowl.

.

7) Remove the cowling (preferably not moving the engine, but that's what the marks are for – i.e. in case you do) and mark the engine mount holes. Then drill small pilot holes through the firewall, followed with an 11/64"" (4.2mm) drill in 4 places.



8) Test the engine location by inserting (4) 8-32 socket head cap screws (#7) through the engine mounts and refit the cowl and spinner back plate.

9) This is a good time to locate and drill a 5/32" (4 mm) passage hole for the throttle pushrod.

For most two cycle engines, a good place to put the hole is to the left of the lower engine mount. This will clear the fuel tank to be installed next. The exact location will depend upon your choice of engine. You can see in the picture where we lined up the hole with the carburetor throttle arm (hidden) using a long drill.

10) Secure the motor mount in place with the 8-32 locknuts and flat washers. (Supplied)

Conventional Landing Gear Installation

If you are building the model in the 'TD' version (tail dragger), then this is the time to install the landing gear. ***If you are building the FT version then you already completed the main gear and should skip this section.***

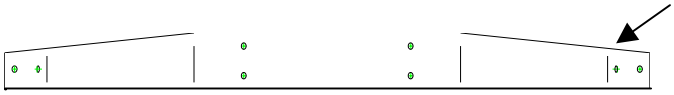
1) In the U.S. pack we have supplied a set of DuBro 5/32" axles, improving upon the threaded bolts that are frequently used as axles. Two minor modifications are required to enable using them:

   a. Cut them to length. Cut off approximately 3/8" (9.5 mm) so that the axle portion measures 1 ½" to 1 5/8" (38 – 41mm)

   b. Enlarge the main gear bolt holes (those closest to the ends of the aluminum gear). Using the existing hole as a pilot hole, drill them out to to 5/16". This will allow insertion of the threaded portion of the axle into the landing gear.

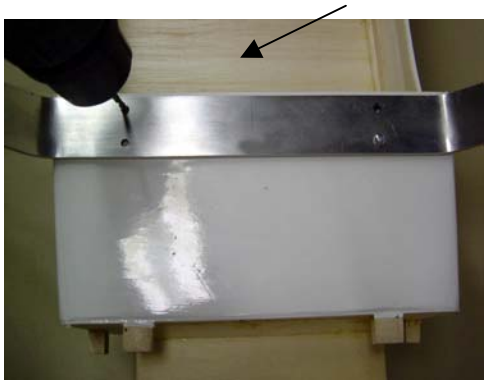
   c. Install the axles onto the main gear and secure with the supplied locknuts.

2) You will see that the aluminum gear tapers from the center section down to the wheels along one edge, and is straight across on the other edge. You will be installing the landing gear so that the tapered edge is forward.



3) Locate the six (6) 6-32 bolts and blind nuts in the U.S. Pack.

4) Position the formed aluminum landing gear on the bottom of the fuselage so that the rear edge is 3/16" (5mm) in front of the wing opening, centered, and the <u>straight edge faces the rear.</u>

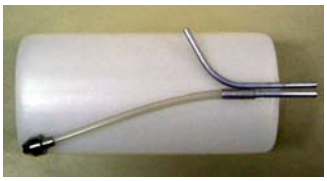


5) Using the holes in the landing gear as a template, drill the first hole with a 5/32" (4mm) drill. Insert a 6-32 bolt (no nut yet), reposition the landing gear and drill the second hole. Insert a bolt. Now you can finish drilling the remaining 2 holes.

6) Position the gear back in place, insert the bolts, reach inside and start threads of the blind nuts, barbs towards the wood. Tighten the nuts into place. (A late breaking observation: The bolts may pass through the corner blocks inside that run along the length of the landing gear mounting pad, and almost certainly the blind nut flanges will meet these braces at an angle. We apologize for this and didn't catch it when we decided to beef-up the landing gear area. You can either carve away the corner block in the area around the blind nut, or just tighten up the nuts against the balsa block, and then periodically check tightness until the blind nut settles in.)

Installing the Fuel Tank

1) Referencing the pictures, assemble the fuel tank so that the flat side with "380 CC" becomes the top. Replace the fuel line supplied with the tank, with a piece of the fuel line supplied with the U.S. Pack. (It's better quality.) You will need to gently bend one long piece of tubing to reach up to the inside top of the tank to create the vent line.



2) The short fuel pickup piece enters straight in. Use the holes in the black plug that go all the way through. Mark the large outside metal disk with (F)uel and (V)ent so you know which tube is which. Mark either or both ends of the tank with "up" or "Top" for later installation. Do not tighten the plug screw yet.
   - If your kit was supplied with the optional DuBro 'Fill-it Fueling System' in the U.S. Pack, you will use the DuBro third piece of tubing to enable remote refueling. You will pierce the third hole in the rubber stopper. Follow the installation directions on DuBro's package to install the filler. If you do not use the fueling system, you will not use the other long piece of aluminum tubing packed with the fuel tank.

3) The rubber plug fits tightly and a flat blade screwdriver (used carefully) around the edge helps to get it in the hole.

4) Making sure that the vent tube is properly oriented, i.e. pointing to "UP", tighten the plug screw until it is snug and the plug is firmly held in place. The plug expands between the two metal disks to create the seal.

5) The tank will be installed using two tie-wraps (#17). To make installation easier you will make the loops inside the fuselage, slide the tank into place, then tighten the loops. Referring to the picture:

   a. Create two loops around the tank bracket, just starting the tie-wraps into the first few 'clicks'. Don't pull tight at all.

b. Slip the tank into the loops, tubes end forward and (optionally) slip a thin piece of foam between the tank and the support. (The foam helps the tank to resist sliding.)

Optional foam here

c. Using a pair of needle nose pliers, pull the tie-wraps tight and cut the ends.

Stabilizer and Rudder Installation

Sequence of events in this section:

- Fitting and bonding the stabilizer into place
- Hinging the Elevators and Rudder
- Attaching control horns to the Elevators and Rudder

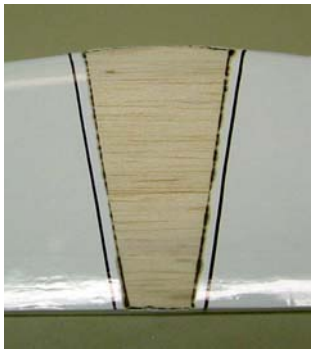
Fitting and bonding the Stabilizer into place

In this section the stabilizer is positioned and marked for removal of the Oracover in the area that will have epoxy applied. The stabilizer is then bonded in place while ensuring that it is centered and square.

1) Install the wing. (You will use this to ensure that the stabilizer is parallel.) Locate the stabilizer and pull the elevators off the unglued hinges. Mark the parts so you know which side was which and which side was up!(It is symmetrical about the chord line)

2) Slide the stabilizer into the hole in the fuselage and center it by measuring equal distances along the trailing edge from the side of the fuselage to a convenient 'corner'.

3) Set the stabilizer square with the fuselage by measuring from the trailing edge of the wing (not from a control surface) to the trailing edge of the stabilizer, on both sides and setting the measurement to be equal.



4) With a felt tip pen or the back side of a knife to create a shallow indent, mark the stabilizer along the edge of the fuselage on both the top and bottom.

5) Remove the stabilizer and with the soldering iron or razor knife, scribe a trim line 1/8" (3mm) inside the pen lines, and across to each other to create a

trapezoid. Do this on the top and bottom of the stabilizer. Remove the isolated trim.

6) Using Acetone, MEK or Alcohol, clean away the pen lines that may be left on the fuselage and stabilizer. (Wear the appropriate protective garments while using these solvents.)

7) Using 30 minute epoxy applied to the top and bottom of the stabilizer, slide the stabilizer into place. Slide the stab slightly past the desired point, and then return, to be sure adhesive is spread across the entire surface. Re-measure to be sure the stabilizer is centered and square with the fuselage

8) Wipe away excessive epoxy, and clean area with Alcohol.

9) Verify correct position and check to confirm square by measuring again, and set aside to dry.

Hinging the Elevators and Rudder

In these steps we repeat the process we used to attach the ailerons and flaps.

1) Remove the elevators from the stabilizer if not already done, and locate the rudder (Packed separately.)

2) Pull out the CA hinges and trim away the Oracover from around the slot in the elevators, rudder, vertical stabilizer and stabilizer.

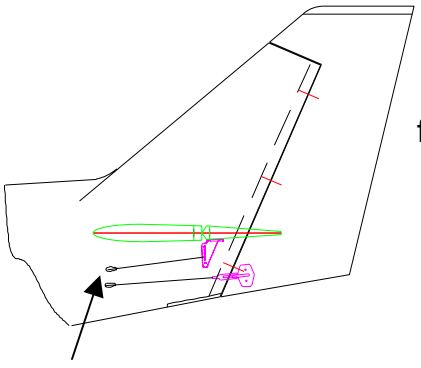
3) Drill a 1/16 (1.6mm) hole in the center of each slit to help wick the CA into the slot.

4) Test fit the parts to be sure gaps between surfaces are proper and that the CA hinges fit properly. Install the hinges in the stabilizers, ensuring that they are half way in and apply 4 drops of Thin CA adhesive to both sides of the each hinge.

5) Position the control surfaces back into location inserting the CA hinges into their respective slots, and apply the CA adhesive to both sides of the hinges on the control surfaces

Servo and Pushrod Installation

In this section we will attach the rudder and elevators control horns, mount the servos, and install the pushrods that operate the aft control surfaces and ground steering. We will also install the throttle servo and discuss the routing of the throttle pushrod wire.



At left is a section of the model drawing showing the location of the hard points on the rudder for mounting the rudder horn. Also shown is the location of the slots in the fuselage side for the pushrod exits.

1) As you will install the rudder horn on the left side of the aircraft, locate and cut away the covering from

both pushrod slots on the left side of the model, and only the upper elevator slot on the right side of the aircraft.

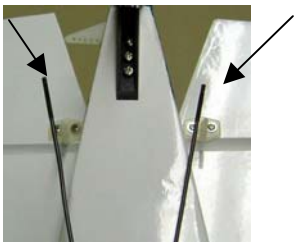
Elevator Pushrod Installation

2) Retrieve the 15 ¾" wood dowel pushrod that has two slots on one end and one slot on the other. Then locate (1) 7 ½" wire rod threaded one end and (1) 7 1/8" wire rod threaded one end and (1) 6" wire rod threaded one end. The following steps will secure the wires to the dowel by bending a leg and bonding the wires into their slots. (The wires are different lengths so that the bent legs inserted into the dowel are not trying to fill the same hole. Two staggered holes are provided)

   a. Bend a ¼" 90 degree angle in the non-threaded end of each pushrod wire.
   b. Slide a piece of heat shrink tubing over the ends of the dowel.
   c. On the end with two slots, insert the bent leg of the longest wire into the hole furthest from the end and epoxy the wire into the hole and slot.
   d. Insert the bent leg of the second longest wire into the opposite hole/slot and 5 minute epoxy in place.
   e. Slide the heat shrink tubing to be flush with the end of the dowel and apply heat to firmly hold the assembly in place.
   f. Repeat the process for the remaining 6" wire length in the other end of the pushrod.

3) While the elevator pushrod is drying, build the Rudder pushrod in the same manner, installing a 7 ½" wire on one end, and a 6" wire on the other.

4) After the elevator pushrod is dry, lay the fuselage upside down on the workbench. Spread the two legs on the one end to create a shallow 'Y'. With the pushrod laid against the bottom of the fuselage along the centerline, spread the legs so that they line up with the elevator horns when viewed from above.



5) Locate the two plastic pushrod tubes supplied with the kit. You will use these to assist with inserting the 'Y' end of the rod into the fuselage so that they exit through the elevator push rod slots.

   a. Insert the plastic tubes from the outside of the fuselage through the elevator pushrods holes.
   b. From the cockpit area insert one leg of the pushrod into each tube, and then slide the pushrod and tubes rearward until the rods exit from the slots. *(A late breaking observation: If these tubes are too short to work conveniently, insert and tape a metal rod in the tail end of the tubes – this will allow you to insert the tubes further into the fuselage.)*

c. Trial fit the pushrod until it operates smoothly over approximately a 1" forward and backward travel. Be sure the dowel does not rub against an interior frame. This may require further opening angling of the holes relative to horizontally. A long ¼" drill does a great job on this. This area is solid balsa, so there is room to file or drill.

6) Bend the exiting pushrods so that they are parallel to the centerline of the aircraft. Locate two black nylon clevises and silicon keepers. Slide the keeper over the exiting rod on each side, and then thread at least 20 half-turns the clevises to the end of the rods.

7) The control surfaces have 'hard points' into which you can screw directly to secure the control horn. Position the horns so that they are in line with the pushrods. Attach the control horns using two #2 x3/8" washer head screws. If you desire more strength, nylon backing plates are provided, but will require longer screws which were not supplied. Note that both elevators require control horns.

8) Move the pushrod forward and backwards to be sure the elevators move freely. Bend the pushrods where they exit the fuselage equally as necessary to operate freely.. The clevises should go straight into the control horns and should not bend where the horn pivots with the clevis. Wait to set the elevator position with the clevis until after the servo is mounted.

9) To mount the elevator servo, center the pushrod in the cockpit so that it aligns with the center of the fuselage (You can see that if you move it side to side you will affect the relationship between the two elevators. Keeping it centered will minimize dissimilar movement when the servo moves the rod.). Position the servo slightly to one side so that the servo arm hole is on center with the rod, and secure using the screws provided by the radio manufacturer.

10) Turn your transmitter on and plug the servo into the receiver. Electrically center the servo with the trim centered. Position the servo arm so that it is at right angles to the elevator pushrod. Trim/cut the other servo arms as necessary to prevent interference with the pushrod action at extreme travel. Turn the radio off, transmitter last.

11) Hold the pushrod next to the servo arm and bend a right angle in the rod at the desired hole location so that it can enter the hole in the servo arm (allowing 1/16" (1.5mm) bend allowance). You can either complete a 'Z' bend, or bend at a right angle and cut the wire off with a minimum 3/16 (5mm) inside leg, and use a Quick Link to secure the pushrod in the servo arm.

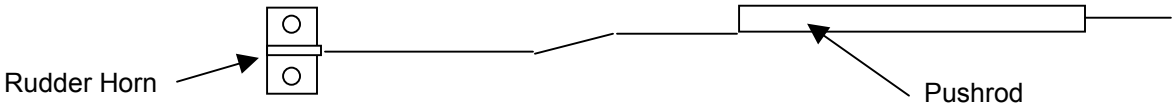
12) Electrically center the servo again. Double-check the position of the elevators. Adjust the clevises as necessary to even-up the elevators and align them with the stabilizer.

Rudder Pushrod Installation

13) Using the same 'tube technique' as above feed the rudder pushrod, threaded end first, through the fuselage so that it exits the lower slot on the right side of the fuselage. The pushrod will run alongside the port side of the elevator pushrod.

14) Locate a nylon clevis and silicone keeper ring. Slide the keeper over the exiting rod and thread the clevis at least 20 half-turns.

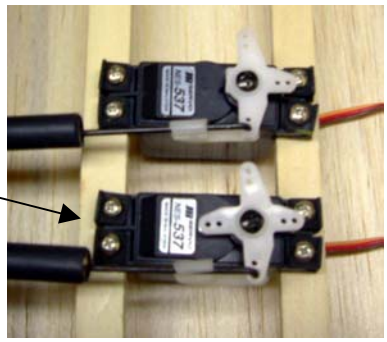
15) Position and secure the rudder elevator horn, in line with the pushrod. The pushrod may require an offset bend as it exits the fuselage to run parallel to the centerline of the fuselage and have the dowel clear the frame on the inside. The junction of the metal rod with the wood dowel can interfere with a frame inside the fuselage. Since the rod is mounted to one side of the dowel, rotating the dowel in the clevis will rotate the edge on the dowel away from the frame. Do this before bending any offset. Holding the clevis at the rudder horn, rotate the dowel/pushrod in the clevis to minimize this possibility and then bend the diagonal offset.



16) Connect the clevis to a middle hole in the rudder horn.

17) Test operate the rudder pushrod.

18) Looking at the fuselage upside down through the wing opening, position the rudder servo just to the port side of the elevator servo. Allow enough room for the servo arms to clear each other. Secure the servo with the screws supplied by the radio manufacturer.

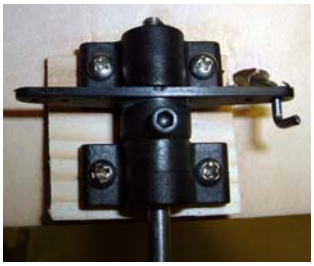


19) Electrically position the servo arm at 90 degrees to the servo with your radio, trim centered, and size/bend the rudder pushrod length as you did with the elevator pushrod. In the picture forward is to the right, the bottom servo is the rudder servo and the top servo is the elevator servo.

Nose Wheel Steering Installation (FT Gear Option)

20) The nose wheel steering is operated by a .070" (1.8mm) dia. pushrod wire, which slides inside a nylon tube/housing.The nose wheel steering pushrod

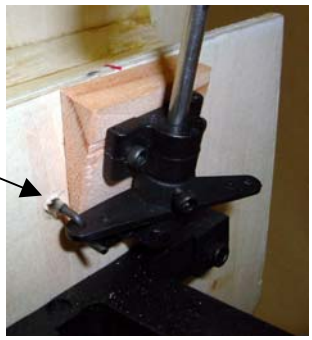
requires a hole to be drilled in the firewall through which the nylon housing/steering wire will pass.



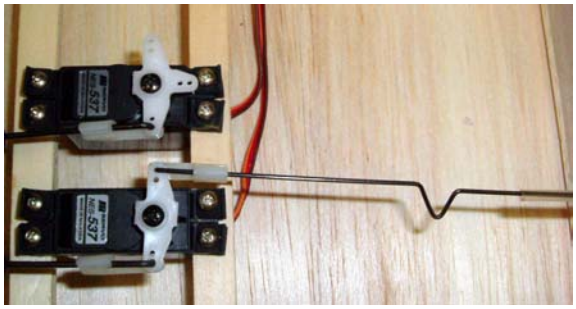
a. Temporarily install the nose gear with the steering arm in place. Orient the arm so that the bushing is towards the bottom and the angled part of the arms are towards the firewall.

b. Referring to the pictures, Drill a 5/32" (4mm) hole in the firewall directly behind the steering arm (on the port side of the model.)

c. Locate a length of Nylon guide tubing and feed into place through the new hole. Cut so that it projects just slightly past the firewall and ends as shown in the picture.



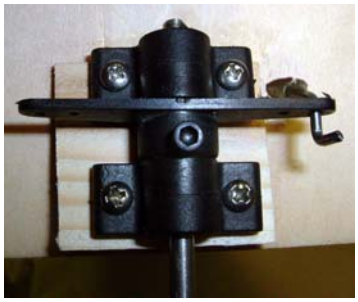
d. Locate the steering pushrod wire. This is a single length long enough to fit between the servo and the steering arm. With needle nose pliers, make a 'Z' bend at one end to fit the steering arm. Remove the steering arm from the nose gear and insert the 'Z' end into the arm so that it will be properly oriented when you reassemble it to the gear. From the front side of the firewall, insert the straight end of the pushrod into the tube and assemble the arm to the gear.



e. After the wire is inserted, make a 'V' bend to allow for minor adjustments. Be sure to leave enough room for the rod to move full travel without the "V" hitting the end of the nylon housing.

f. Size and bend a right angle at the servo arm and attach with a Quick Link.

g. Electrically center the servo/rudder with the radio and manually square the nose gear/steering arm at the firewall. Verify that there you will get full travel left and right. Adjust the steering arm to be straight across by opening or closing the 'V' bend. (Do not tighten the steering arm setscrew. Later you will be disassembling to fit the cowl and size the height.)



h. When you are comfortable that the rod moves freely and is properly operated by the servo, and that the initial adjustment has the nose wheel

straight when the rudder is straight, secure the Nylon guide tube to the fuselage with Epoxy at the firewall.

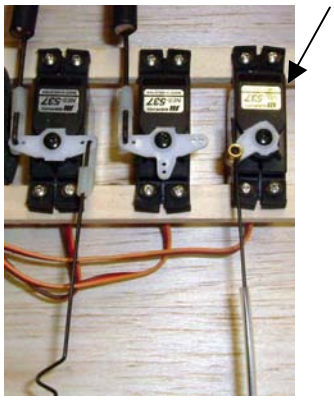
Throttle Pushrod Installation & Fuel Line Connections

The throttle is operated by a .050" (1.3mm) dia. pushrod wire, which slides inside a nylon tube/housing. Installation will vary, particularly if you are installing a 4 cycle engine. *If you did not drill the throttle wire passage hole earlier, remember that the fuel tank is now behind the firewall – so drill carefully!*

21) Retrieve the pushrod wire and nylon tubing and bend a 'Z' bend on one end of the wire to fit the engine throttle arm. Alternatively you can bend the end at a right angle making a ¼" leg and use a Quick link to secure. Insert the leg so that it points away from the centerline of the aircraft. This will likely 'spring load' the rod so that if the keeper is lost, it will 'fail safe' and not fall out of the hole.

22) Retrieve your servo throttle and remove the servo arm. Retrieve and assemble the Throttle Rod Connector (31) to the servo arm. Be sure to use a washer on the bottom side of the servo arm and secure with Loctite or similar thread locker. Set aside. (This part rotates as the arm moves, so the nut must be protected from loosening.)

23) Mount the throttle servo next to the Elevator servo, and with the radio on, move the throttle stick to full throttle full 'fast' trim and turn off the radio, transmitter last. (Be sure to verify direction of travel required for your engine throttle operation and reverse the servo operation as necessary with your transmitter settings.)



24) Test fit the nylon housing over the throttle wire and mark and cut to size if necessary so that the housing does not interfere with throttle arm and servo arm operation.

25) Slide the connector/servo arm over the throttle wire and position the servo arm on the servo output splines so that the engine would be at full throttle. Replace the servo arm screw. Slide the throttle rod to the full throttle position on the engine and snug the Allen screw securing the wire. Test the entire installation to be sure the throttle moves full travel and full down trim closes the throttle entirely. If you must err in one direction, slight over-travel when pushing the rod will spring the rod slightly, which is more acceptable than straining on the rod when pulling. If you have a computer radio the better way is to set the control throw exactly.

26) Bond the nylon housing tube to the firewall so that it will stay where originally positioned. We recommend bracing/epoxying the throttle rod housing at a mid

point. Bonding a scrap piece of balsa to the frame works well. Be sure to allow the end near the servo to move with the servo arm.

27) If you have not done so already, install the fuel line from the tank to the engine through the hole in the center of the firewall, and attach a piece of tubing to the vent tube for later exit from under the cowl.

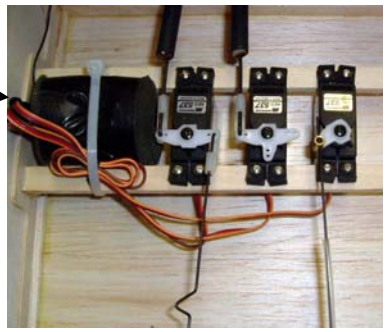
Completing the Radio Installation

In this section we will secure the receiver, install the switch/charging harness, and run the antenna.

1) You will need two "Y" connectors for your receiver; One to operate the flaps, and the other to operate the ailerons. (Previously identified in "Building the Wing" section)
   a. Plug-in all connectors and secure
      i. Aileron 'Y'
      ii. Flap 'Y'
      iii. Throttle Servo
      iv. Rudder Servo
      v. Elevator Servo
      vi. Battery pack into switch *(secure junction with tape or heat shrink tubing.)*
      vii. Battery power from switch into receiver

2) Wrap the receiver in foam and secure foam with duct tape or equivalent. The receiver should be able to 'float' a little inside the foam.

3) Position and secure with a tie wrap, the receiver as shown in the picture



4) Install the switch harness. Thinking about your trim scheme at this point is a good idea, as the switch is best hidden when located against a dark color. Alternatively, you can wait to install the switch until after you've trimmed out the model.

5) Route the receiver antenna. You have many choices here, and factors affecting your choices include the landing gear configuration you've selected and how visible you want the antenna.

   a. For the conventional gear we like to exit the antenna wire through a small hole placed in the bottom of the fuselage just behind the wing mount and run the wire back to and through the tail wheel bracket

Note 'buckle' made from cut-off servo arm. This type of buckle can also be used inside the fuselage, instead of a knot, to prevent the antenna from pulling through the hole.

i. Note that this method may expose the antenna to possible tall ground hazards. The advantage is that the antenna is much less visible.

b. For the tricycle gear version (and for those preferring lower risk to antenna damage), exit through the top of the fuselage through a small hole just behind the canopy and run the wire to a pin in the tail. Running the antenna along the bottom of the aircraft for the tri-gear version is not recommended, as there is no tail wheel to protect the antenna from catching in the grass during a tail low landing.

6) You will use the battery mounting to assist with the weight and balance of the aircraft. As such, we leave this to you to determine the best position for your model. You will want to wrap the battery in foam, and tape, again allowing 'float' for vibration isolation. You can secure the battery in your choice of location using Velcro, Tie-Wraps, adhesive backed wire tie anchors, etc. Just remember that it has a certain amount of mass, and you don't want it loose in the cockpit during your, no doubt perfectly coordinated, ball centered, aerobatic routines!

Fitting Wheels and Fiberglass Components

Installing Main Gear Wheel Pants – Both Gear Configurations

Wheels are assembled to the axles using collars to prevent them from slipping off. Main gear wheel pants are retained using brackets that are installed in the wheel pant. This method absorbs impacts by allowing rotation of the wheel pant, rather than breaking it.

1. Locate in the In the U.S Pack (2) are Sullivan wheel pant mounting brackets. These brackets are installed on the inside of the wheel pant.

2. Locate the two main wheel Wheel Pants and drill a 5/32" dia hole on one side of each (at the indentation) – make sure you make a left and a right by drilling on opposite sides – both sides have indentations.

3. Using the 5/32" drill to simulate an axle shaft, position the bracket on the outside of the wheel pant and mark the location of two mounting holes. Remove the bracket (or use it as a template) and drill two 1/16" (1.5mm) holes. *(DuBro retainer shown in pictures, Sullivan installation is identical.)*

4. Assemble the bracket bolt and nut as shown in step 1 picture. Position the bracket flat side against the inside of the wheel pant, and secure using two sheet metal screws (#20) from the outside. (Using the drill shank again helps with alignment.)

5. Slide the wheel pants and wheels on the gear and trial fit/trim the wheel pant openings as necessary for access to the wheel pant bracket bolt and to facilitate putting the wheel retaining collar in place.

6. Secure the wheel pant, and retaining collar so that the wheel spins freely, and the wheel pant is snug to the axle shaft.

Installing the Nose Wheel and Wheel Pant/Fairing (Tricycle Version)

The nose gear wheel pant fits the shape of the nose gear wire and is held in place by a nylon bracket after a 5/32" dia. axle hole is drilled at the bottom of the molded groove. You will need to remove the nose gear from the steering bearing blocks if you have not done so already.

1) Retrieve the nose wheel pant/fairing and drill a 5/32" dia. (4mm) hole at the bottom of the gear groove.

2) Position the Nylon Wheel pant retainer (No. 21) over the axle and drill two (2) 1/16" dia (1.5mm) holes. The holes will enter into the inside radius of the molded groove, where there is thicker resin than normal. If you would like to strengthen this area, mix up some 30 minute epoxy with flox or fine sawdust and place a 'blob' over the holes on the inside of the wheel pant. After it is well cured, you can re-drill the two holes. The screws will self tap.

3) Trial fit the wheel pant/fairing with the nose wheel and spacing collars on to the nose gear. Trim the nose wheel opening as appropriate. (On our model we had to notch the upper fairing to fully seat the bend in the groove. These nose gears are hand bent – remember the low volume - and this piece is 'tolerance challenged'.)

4) Using (2) No. 2 washer head screws, attach the gear to the fairing with the wheel pant retainer.

5) Reassemble the nose gear into the bearing blocks, being sure to properly orient the steering arm/Z-bent steering pushrod. Do not tighten the setscrew on the steering arm yet.

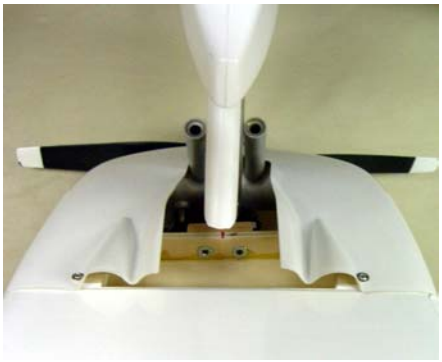
Final Cowl Fitting

Verify that the cowl fits properly over your selected engine, and provide openings as necessary for glow plug ignition access, needle valve access and chosen muffler configuration.

Install your choice of muffler. We used a Slimline muffler on an OS 61 Engine. This is a very close fit and we recommend removing some of the lower engine mount to allow clearance for the muffler, as opposed to inserting a spacer at the

exhaust outlet for clearance with the engine mount. The lower surface of the cowl sweeps rearward at a shallow angle and may interfere with the barrel of the muffler.

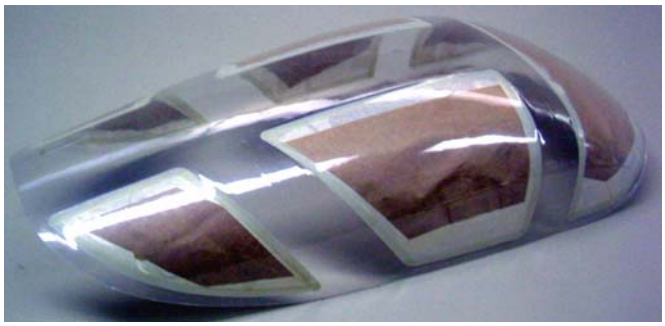
If building the tri-gear version, while trial fitting your cut-outs for the muffler, set the nose gear height so that the leg fairing clears the bottom of the cowl by at least ¼". If you install the muffler as we did (with the large cutaway in the bottom of the cowl), you will not have to worry about the fairing hitting the cowl when the nose gear bends rearward during a hard landing.



Do not attach the prop and spinner and cowl permanently yet, as we have left the top of the engine box cover off for possible insertion of balancing weights. (Although not likely if you have built the model with a larger engine.)

Canopy Installation, Painting and Trim

To add realism to the canopy the 'fuselage' portion requires painting. The canopy windows can be masked and the space between is painted from the inside. We suggest using either Krylon 'Fusion' paint available at most hardware stores, or Top Flight "Lustrekote" available at hobby shops.



1) Mask the areas of the canopy that are not to be painted, and spray the inside with at least 4 light coats.
    a. Alternatively, you can not mask, and hand paint the desired area using the molded edges as a guide. Use a small flat brush with sufficient paint on it to allow the edge to 'flow'. (Ask the woman in your life about how she gets straight edges when she applies nail polish!)

2) Install the canopy to the airframe using 6 No.2 Washer Head screws. Pre-drill locations with 1/16" (1.5mm) drill.

Painting

Your model is covered with a premium quality polyester covering made in Germany known as Oracover. In the U.S. it is popularly known as Ultracoat$_{TM}$.

If you paint the model there is a 'best practice' technique for ensuring the best possible bond to the polyester film. Our recommendation is to visit the Top Flight Models web site and read/print their instructions for painting Monocote. The address for their instructions is: http://www.monokote.com/lustrekote/painting-tips/topr7200tip1.html
In a nutshell, the process is to scuff sand the film with 00 steel wool so that a mechanical bond can be made to the film. A primer may be applied and then the top coat. They recommend the use of their Lustrekote paints, which have been tested for adhesion and glo fuel resistance.
If you are not modeling a specific aircraft, you may choose to finish off the model using the trim colors we have supplied. The model comes with three (3) sheets of Vinyl trim, which transforms the model significantly. The sheets are computer cut and you will want to orient the pieces to the diagrams below before removing the pieces.
You can use the box cover picture as an example. We used the primary color as the bottom stripe on the fuselage and outside stripes on the wings and stabilizers. The dark Grey is the thinnest stripe and makes a good transition to the lighter silver color. Note that you can cut a curve into the three stripes after they are applied to add a different dimension to the look.

Grey Trim: Layout is identical to Silver, only stripes are thinner.

Recommended Propeller Sizes

A scale propeller on the model would measure 1:4.66 of 72" or 14". We recommend as large a propeller as possible (and a correspondingly finer pitch) so that it extends beyond the sides of the fuselage and good 'traction' is provided.

	.46	.51	.60 - .65	.80 - .91
2 Cycle	12 x 5	12 x 6	13 x 5	
4 Cycle		12 x 5	14 x 5	14 x 6

Control Throws

We recommend the following control surface movement for the initial flights:

Rudder, measured at the point where the rudder passes over the top of the dorsal fin, each side of center: 1/2" – ¾" (12mm – 19mm).

Elevator, measured at the trailing edge near the rudder, each direction from center: 1/2" – 3/4" (12mm – 19mm)

Ailerons, measured at the wing tip end, each side of center: 3/16" – 5/16" (5mm – 8mm).

Flaps, measured at the trailing edge from top of flap to top of wing: 13/16" (20mm)

Weight and Balance – **This is probably the most critical assembly step you do!**

We recommend setting the balance of the model at 2 3/4 “(70mm) aft of the leading edge at the fuselage, or – allowing for the taper of the wing - 1 3/16” (48mm) aft of the leading edge at the wing tip (This is the 25% chord line.) Moving the balance point further forward up to ½” will increase the pitch stability of the model. Err in that direction for the first few flights. Moving the balance point aft will decrease the pitch stability, giving a livelier feel - at the risk of being able to easily over-control the aircraft. Try our setting and then feel free to experiment.

Bench Pre-Flight

In case we didn’t mention it before:

- Bond on the top of the engine box. We waited until the last moment on this, in case you needed access for weight and balance.
- Make sure all clevises have their silicone keeper rings in place and as close to the servo or control arm as possible.
- Make sure all servos have their output arms held in place by the center screw
- Be sure the steering arm has been tightened – consider using loctite to secure
- Check that all control surfaces move freely
- Check that control surfaces are at the same relative angles – i.e. in line with the flying surface to which they are attached.
- Check that all control horns are firmly attached
- Check that all control surfaces are firmly hinged by tugging on them
- Put some fuel in the tank and make sure the plumbing is correct
- Check correct operation of control surfaces with your radio – that left is left, etc..
- Go have fun and enjoy safely.

EAM Experimental Aircraft Models
www.RCHomebuilts.com

33924 Cotswold Rd
Farmington Hills, MI 48335
Ph. 248-473-7232 Fax 248-615-3690